

**REMARKS**

Claims 1-10 are pending in this application. By this Amendment, claims 1, 5 and 6 are amended. Reconsideration of the application is respectfully requested.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration as the amendments amplify issues previously discussed throughout prosecution; and (c) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

The Office Action maintains the rejections presented in the August 18, 2005 Office Action. Accordingly, the Office Action rejects claims 1, 3-4, 6, 8 and 9 under 35 U.S.C. §102(b) over Kapon (EP 1028505); claims 6-10 under 35 U.S.C. §103(a) over Martinson et al. (IEEE Photonics Technology Letters 1999) in combination with Shieh et al. (U.S. Patent No. 5,293,392); and claims 2, 5, 7 and 10 under 35 U.S.C. §103(a) over Kapon in view of Shieh. The rejections are respectfully traversed.

In particular, none of the applied references disclose or suggest a method for manufacturing a surface emitting semiconductor laser that includes forming a boundary region for suppressing light emission of oscillation modes except for a single specific oscillation mode, as recited in independent claim 1. Moreover, none of the applied references, alone or in combination disclose or suggest a method of manufacturing a surface emitting semiconductor laser that includes forming an upper reflection layer having a surface layer which forms a light emitting surface of a single light emitting region, as recited in independent claim 5. Finally, none of the applied references, alone or in combination,

disclose or suggest a method for manufacturing a surface emitting semiconductor laser that includes forming an upper reflection layer having a surface layer which forms a light emitting surface of a light emitting region, wherein a media of the surface layer which forms the light emitting surface of the light emitting region has a different refractive index than a media of the surface layer of a neighboring light emitting region, as recited in independent claim 6.

Kapon teaches a vertical cavity surface emitting laser device that includes a plurality of VCSEL elements arranged on a common substrate (Abstract). Moreover, Kapon teaches that "the VCSEL device of the present invention allows ... a high continuous output power exhibiting a single transverse radiation mode" (emphasis added), as indicated in col. 3, lines 22-28. Kapon teaches emitting a single transverse radiation mode, and in fact teaches that the single transverse radiation mode is the "super mode" (col. 8, lines 28-32). In other words, Kapon does not teach or suggest suppressing light emission of several oscillation modes except for a single specific oscillation mode, but teaches only emitting a unique and single transverse radiation mode. Thus, Kapon fails to disclose or suggest the features of independent claim 1.

Moreover, with respect to the subject matter of independent claim 5, the Office Action states that "though Kapon forms several VCSELs, Kapon characterizes the invention with respect to single VCSEL" (emphasis added; Office Action, page 3, lines 1-3). It is respectfully submitted that independent claim 5 is a method claim, and the method step of forming a lower reflection layer, an active layer and an upper reflection layer having a surface layer which forms a light emitting surface of a single light emitting region, is not taught in Kapon. Kapon teaches a plurality of VCSEL elements (Abstract). Although Kapon may focus its disclosure on the workings of one of the VCSEL elements, it is clear from the disclosure in Kapon that the same is applicable to all of the other VCSEL elements, which results in Kapon teaching a plurality of high emitting regions. Accordingly, Kapon does not

disclose or suggest an upper reflection layer having a surface layer which forms a light emitting surface of a single light emitting region, as recited in independent claim 5.

With respect to the subject matter of independent claim 6, the Office Action states that the refractive index is different in the light emitting region "where there is air gap 6" compared to the grid 4 (Office Action, page 3, lines 4-6). It is respectfully submitted that the refractive index of the surface layer recited in independent claim 6 is the refractive index of the medium constituting the surface layer, and does not comprise the refractive index of "air" that may surround the surface layer. The Office Action seems to indicate that any recesses in the surface layer should be construed as being part of the medium constituting the surface layer. Applicants respectfully disagree. As indicated in the specification at, for example, page 9, lines 23-25 and page 10, lines 13-14, a boundary region is defined as being a recess formed in a part of the surface layer, or a projection formed in a part of the surface layer. Accordingly, it is clear that the recesses that exist in the surface layer are not part of the medium of the surface layer. Accordingly, the surface layer in Kapon cannot include any air gaps 6 if it is to be compared to the claimed surface layer. Thus, Kapon does not teach a refractive index that is different than the refractive index of a neighboring light emitting region, because the air gap 6 in Kapon cannot be a neighboring light emitting region. Thus, Kapon does not teach or disclose the features of independent claim 6.

Finally, Kapon fails to explicitly teach that the surface layer comprises semiconductor material. Although the August 18, 2005 Office Action alleges that substrate 9 is a semiconductor, substrate 9 is in fact a metal, as indicated in paragraph [0032] of Kapon.

For at least the reasons discussed above, independent claims 1, 5 and 6, and their dependent claims, are patentable over Kapon. Thus, withdrawal of the rejection of the claims under 35 U.S.C. §102(b) is respectfully requested.

Martinson teaches transverse mode selection in large area oxide-confined vertical cavity surface emitting laser by etching a shallow surface relief (Abstract).

Shieh teaches a top emitting vertical cavity surface emitting laser with an etch stop layer positioned in the top mirror stack so the stack can be etched to form a trench surrounding a mesa with the emitting area on the mesa and the trench confining current flow and lasing to the mesa (Abstract).

Accordingly, none of the applied references, alone or in combination, disclose or suggest a method of manufacturing a surface emitting semiconductor laser that includes forming a surface layer which forms a light emitting surface of a light emitting region, wherein a media of the surface layer which forms the light emitting surface of the light emitting region has a different refractive index than a media of the surface layer of a neighboring light emitting region, as recited in independent claim 6. Neither Martinson nor Shieh disclose or suggest any relationship between the refractive indices of light emitting regions. Accordingly, none of the applied references disclose, suggest or render obvious the features of independent claim 6. As such, independent claim 6, and its dependent claims, are patentable over Martinson and Shieh.

Finally, Shieh fails to cure deficiencies in Kapon in disclosing or rendering obvious the features of claims 2, 5, 7 and 10, including the limitations of independent claims 1 and 6.

For at least the reasons discussed above, none of the applied references, alone or in combination, disclose, suggest or render obvious the features of claims 2, 5 and 6-10. Accordingly, withdrawal of the rejections of the claims under 35 U.S.C. §103(a) is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-10 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Tarik M. Nabi  
Registration No. 55,478

JAO:TMN/amw

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**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

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